

Description of a New Cetomimid Fish from Suruga Bay*

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In connection with the studies of the plankton of the depths, a good collection of deep-sea fishes from Suruga Bay has been made since 1964 by the research vessel "Tansei-muru" of the Ocean Research Institute, University of Tokyo. Through courtesy of Prof. Yoshiyuki MATSUE, director of this institute, all the fishes have been passed on to the present writers for taxonomic study prior to the examination of the stomach contents from the ecological viewpoint. The collection comprises most interesting species, and it is thought advisable to report upon them as early as possible in order to expedite further collecting. In the present paper is described a new species representing the whale-fishes, a few members of which have just recently been known to occur in Japanese waters. The writers express their sincere thanks to Prof. MATSUE for the opportunity to examine the remarkable fish collection made by the "Tansei-maru". Also they wish to thank Japan Society for the Promotion of Science for the partial financial support of this study through a grant from this society as a part of the Japan—U. S. Science Cooperative Program.

Cetomimus compunctus, new species

"Iredzumi-kudjirauo", new Japanese name

Figs. 1 and 2

Study material. Only the holotype, Cat. No. 641, Ocean Research Institute, University of Tokyo, has been available. Total length *ca.* 156 mm., standard length 142 mm. Taken by a large plankton net in an oblique haul between 0 and 1800 m. (4000 m. wire out), at a speed of about 2 knots, at station 77 (34°02.8'N; 138°18.8'E), in Suruga Bay, on August 19, 1964.

Proportional dimensions in percent of standard length and counts. Parenthesized letters l and r refer to left and right, respectively.

Greatest depth of body 25.4.

Least depth of caudal peduncle 6.0.

Greatest width of trunk *ca.* 14.8.

Length of head (measured by dividers, not parallel to longitudinal axis of body)
26.4 (l & r).

Width of head 15.8.

* Contribution No. 45 from the Ocean Research Institute, University of Tokyo.

Width between tops of gill-openings 10.0.

Maximum width of head (gill-openings fully opened) 35.2.

Eye-diameter: horizontal, 0.5 (l) & 0.4 (r); vertical, 0.4 (l & r).

Interorbital width 13.0.

Length of snout 9.9 (l & r).

Length of upper jaw 20.8 (l) & 21.1 (r).

Length of lower jaw measured to angular postero-ventral corner 22.2 (l) & 22.5 (r).

Maximum width of gape (maximum width of swallowable food) *ca.* 27.1.

Distance from snout tip to dorsal origin 59.9 (if measured parallel to longitudinal axis of body, 58.8). Length of dorsal base 20.4. Length of longest (11th and 12th) fin-rays of dorsal *ca.* 13.0. Distance from dorsal fin and base of anteriormost dorsal caudal fin-ray 11.6.

Distance from snout tip to anal origin 59.5. Length of anal base 19.7. Length of longest (11th to 13th) fin-rays of anal *ca.* 12.0. Distance from anal fin to base of anteriormost ventral caudal fin-ray 11.6.

Distance from snout tip to dorsal corner of pectoral base 23.2 (l & r). Length of pectoral fin *ca.* 7.0 (l) & *ca.* 6.7 (r). Length of 6th branched fin-ray (counted from top) of pectoral *ca.* 9.9.

Vertical length of caudal fin base 8.5. Caudal fin damaged posteriorly.

Length of 3rd gill-slit 1.8 (l) & *ca.* 1.4 (r). Length of longest gill-lamella of 1st gill-arch 3.5 (l) & 3.2 (r). Length of longest gill-lamella of 4th gill-arch *ca.* 0.6 (l) & *ca.* 0.3 (r).

Length of copula (basibranchials) 0.8. Least width of copula 0.7.

D. 19; at least 8th to 18th fin-rays branched; hindmost fin-ray unbranched.

A. 19; at least 8th to 17th fin-rays branched; hindmost fin-ray unbranched; hindmost fin-ray found in a radiograph.

P. *ca.* 24 (l) & *ca.* 23 (r).

C. vii (unsegmented)+1 (segmented, but short)+7+7 (principal fin-rays; *ca.* 6+6 branched)+1 (segmented, but short)+vii. Counted from a radiograph.

Gill-rakers reduced to denticulous plates, and not counted.

No pseudobranchiae.

Branchiostegals, 10 (l & r).

Number of vertebrae, *ca.* 52 (= *ca.* 33+20).*

* This number is close to that of *Cetostomus regani*, namely, 51, given by PARR, 1929 ("A contribution to the osteology and classification of the orders Iniomi and Xenoberyces." Occasional papers of the Bingham Oceanographic Collection, no. 2, p. 27). It may be added here that in *Barbourisia rufa* PARR and in the two species of *Rondeletia* the number of the pre-caudal vertebrae is smaller than the number of the caudal vertebrae; in *Barbourisia rufa* the number of vertebrae is *ca.* 42 (= *ca.* 17+*ca.* 25) (after ABE & MARUYAMA, 1963, "A record of *Barbourisia rufa* PARR from off the Kurile Islands". Jap. Journ. Ich., vol. x, nos. 2/6, p. 50); in *Rondeletia bicolor* the number of vertebrae is 27 (=11+16) (after PARR, 1929, *op. cit.*, p. 43); and in *Rondeletia loricata* the number of vertebrae is also 27 (=11+16) (after ABE & HOTTA, 1963, "Description of a new deep-sea fish of the genus *Rondeletia* from Japan." Jap. Journ. Ich., vol. x, nos. 2/6, p. 45).

Number of pores in lateral line 5 (between upper corner of gill-opening and bony elevation in front of eye)+24 (l) & 4+ca. 26 (r). Number of similar pores on lower jaw ca. 9 (l) & ca. 8 (r). Number of similar pores behind and below eye 3+ca. 5 (l) & 2+ca. 5 (r). Number of similar pores on each side of mid-dorsal line of snout, 3.

General appearance and coloration. The body is soft and scaleless. The head is expanded laterally and the hind end of the opercle is far behind the upper corner of the gill-opening. Excepting for the belly which is swollen in the present specimen, the body is compressed from the nape to the caudal base. There is a weak keel from the nape to the dorsal origin; and, though short and soft, a black keel along the mid-dorsal line of the caudal peduncle and another along the mid-ventral line of the caudal peduncle are discernible reminding one of the authors (ABE) of the skinny lateral elevation of *Alepisaurus*. The dorsal profile of the head is nearly rounded with a pair of angular elevations above the eye-centers. The eyes are minute, and nearer to the upper jaw than to the interorbital elevation just mentioned. The mouth is extremely large, the hind end of the upper jaw reaching behind the upper corner of the gill-opening. The upper jaw is very slightly concave ventrally, and the lower jaw is slightly concave dorsally leaving the gape slightly open when the jaws are appressed. The pectoral fins are weakly developed and palced low down, the base being below the posterior end of the gill-cover. The pelvic fins are absent. The dorsal and anal fins are placed far back, and nearly opposite to one another, the latter fin beginning and ending a little behind the former fin. These fins are fairly high, nearly as high as the body at the vent.

The caudal fin, somewhat damaged, is apparently not large and truncate or nearly so. The branchiostegal membranes are continuous, and free posteriorly from the isthmus.

The lateral line is very broad and pierced by fairly large pores. The membrane between every two pores is prolonged posteriorly for a short length, and mostly provided with a median longitudinal skinny streak, a small anterior median papilla (with white tip) and a pair of much smaller black papillae placed vertically in its posterior part (*cf.* PARR, 1934, "Report on experimental use of a triangular trawl for bathypelagic collecting." Bull. Bingham Oceanogr. Collection, vol. iv, art. 6, p. 30, fig. 8). Similar pores are present on head above and below.

The nostrils are paired on either side without raised rims, not easily distinguished, appearing like the head pores, and placed close to the upper jaw and nearer to the snout tip. The posterior (or, rather, upper) nostril is larger than the eye and the anterior nostril. Both nostrils are close together, elliptical (though nearly rounded), and their long axis is vertical to each other. The membrane between these nostrils are free from the raised olfactory organ.

The color in alcohol is nearly uniform dark brown, the belly and the dermal

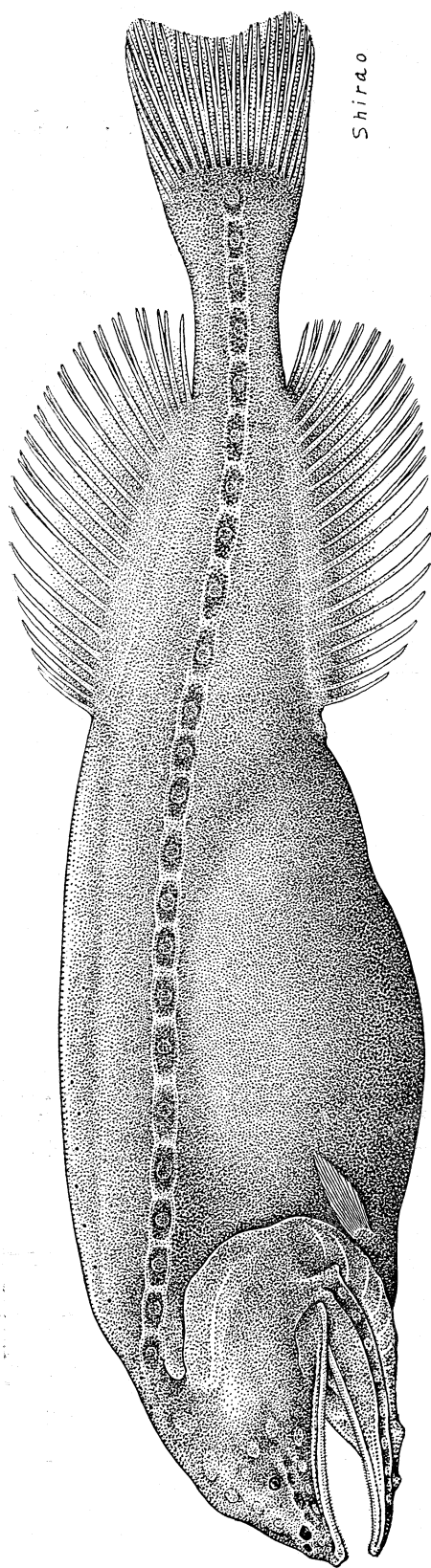


Fig. 1

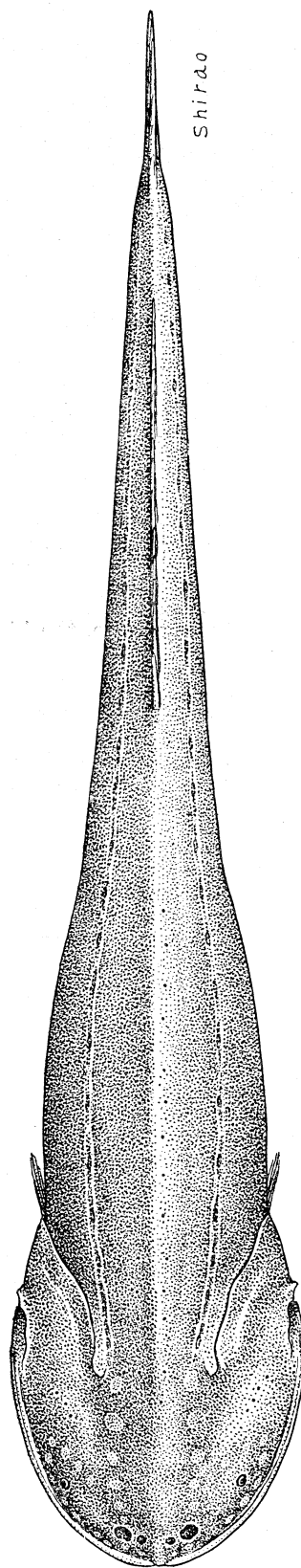


Fig. 2

flaps of the lateral line being much darker; there are short vertical pale bars along the lateral line. From above the top of the gill-opening rearwards, there is a row of extremely small blackish dots numbering *ca.* 12 on either side of the mid-dorsal weak keel. Excepting for the mid-dorsal and anterior parts, the buccal and branchial cavities are whitish. The membrane inside of the upper jaw tooth-band is dark brown, and the majority of the upper jaw teeth, anterior teeth of lower jaw and some of the teeth of the vomer, palatines and upper pharyngeals are blackish due to the presence of a fine black or blackish dot in each of these teeth.

The post-mortem color of the body was reddish brown.

Dentition. Teeth are present on the jaws, vomer, palatines, ectopterygoids*, first and second gill-arches, upper pharyngeals and basibranchials, and very small, the majority being granular. The tooth-bands of the palatines and ectopterygoids are broader than those of the jaws and visible from outside. The jaw teeth are close-set, forming several, a little irregular, longitudinal rows, and the outermost teeth are lower than the inner ones which are low-conical and the largest of all the teeth.

Basibranchials. The basibranchials (or copula or lingual bone) form an elongated dumbbell-shaped dentigerous rod, the anterior expansion being narrower than the posterior one and bordered laterally by the hypobranchials of the attenuated first gill-arch. The length of this rod is slightly smaller than the snout length, and its minimum width is nearly equal to the horizontal eye-diameter.

Cavernous luminous (?) tissue. Cavernous tissue is found near the dorsal origin extending rearwards to the base of the 5th dorsal fin-ray; near the vent extending rearwards to the base of the 1st anal fin-ray; on either side of the mid-dorsal line of the caudal peduncle; and behind the anal fin for a short length on either side of the mid-ventral line of the caudal peduncle.

Distinctive characters and relationships. The present new species belongs to the family Cetomimidae (*cf.* ROFEN, 1952, "Deep-sea fishes of the Bermuda Oceanographic Expedition. Families Cetomimidae and Rondeletiidae." *Zoologica*, vol. xxxvi, part 1, p. 58). As for its generic designation, it is thought better to retain the oldest generic name of cetomimid fishes, namely, *Cetomimus* GOODE & BEAN, 1895, because this genus and its closely related genus *Gyrinomimus* so far understood are remarkably heterogeneous.

(1) In the present new species, as in *Gyrinomimus simplex* PARR, the gills number $3\frac{1}{2}$, the slit behind the 3rd gill-arch is very small being restricted to the upper part of the lower limb of the 3rd gill-arch, and there is no slit behind the 4th gill-arch (although PARR, 1946, did not mention about the gill-slit behind the 4th gill-arch, it is almost certain that *G. simplex* lacks the slit behind the 4th gill-arch). But

* In a previous paper with MARUYAMA, one of the authors (ABE) did not mention the presence of teeth on the pterygoids of *Barbourisia rufa* (ABE & MARUYAMA, 1963, *op. cit.*). It is intermediate between Rondeletiidae and Cetomimidae in the dentition of the palate.

unlike *G. simplex*, the gill-slit behind the 2nd gill-arch of the present new species is not restricted to the lower limbs of the 2nd and 3rd gill-arches, the upper limb being ventrally free of membrane. The present new species resembles *Gyrinomimus bruuni* ROFEN in having more than 3 gills, and in lacking slit behind the 4th gill-arch, but the latter has well developed holobranchs probably on the 4th gill-arch as well (cf. ROFEN, 1959, "The whale-fishes: families Cetomimidae, Barbourisiidae and Rondeletiidae (Order Cetunculi)". Galathea Report, vol. i, pp. 258 & 259). The present new species resembles also *Cetomimus indagator* ROFEN and *Ditropichthys storei* (GOODE & BEAN) in having 4 gill-arches, but the latter two species have a slit behind the 4th gill-arch (cf. ROFEN, *op. cit.*, p. 256; PARR, *op. cit.*, pp. 20 & 21), and *storei* has holobranchs on the 4th gill-arch (judging from the style of description by PARR). It is not certain whether *indagator* has holobranchs on the 4th gill-arch or not. It may be mentioned here that ROFEN, 1952 (*op. cit.*, p. 68), stated "the genus *Cyrinomimus* is superficially characterized by...having 3 gills", and that PARR, 1934 ("Report on experimental use of a triangular trawl for bathypelagic collecting..." Bull. Bingham Oceanogr. Collection, vol. iv, art. 6, p. 29) defined the genus *Gyrinomimus*, *myersi* as type, "gills 3, a small opening behind the 3rd"...*Gyrinomus grahami* RICHARDSON & GARRICK ("A new species of *Gyrinomimus* from New Zealand." Copeia, 1964, no. 3, p. 525) has 3 gill-arches bearing gill-lamellae with a short slit behind the lower limb of the 3rd gill-arch. Among the hitherto known members of *Cetomimus*, with the exception of *indagator*, gills number 3, and there is either a slit (PARR, 1934, *op. cit.*, p. 24) or no slit behind the 3rd gill-arch (ROFEN, 1952, *op. cit.*, pp. 63 & 65). In *Cetostomus regani* gills number 3, and there is a small slit behind the 3rd gill-arch (after PARR, 1934, *op. cit.*, p. 27). It is regretted that the writers have not been able to see the gills of *Gyrinomimus parri* BIGELOW.

(2) In the present new species, many of the jaw teeth and some other teeth are each tattooed with a single dark-brown dot. This seems to be characteristic for it although of the coloration of the teeth in the other cetomid and related fishes seems not to have been mentioned so far. The new specific name *compunctus* is given in reference to the tattooed teeth. It may be added here that the present new species, unlike *Gyrinomimus* (cf. ROFEN, 1952, *op. cit.*, p. 68), does not have elongate cardiform teeth on the jaws.

(3) The shape of the copula (basibranchials or lingual bone) of the present new species differs from that of *Gyrinomimus* (cf. ROFEN, 1952, *op. cit.*, p. 68; 1959, *op. cit.*, pp. 257 & 258), *Cetomimus craneae* (cf. ROFEN, 1952, *op. cit.*, p. 65) and *Cetomimus teevani* (cf. ROFEN, 1952, *op. cit.*, p. 63) in being much narrower, and seems to resemble again (as in the number of vertebrae) *Cetostoma* (cf. ROFEN, 1952, *op. cit.*, p. 68) and *Cetostomus indagator* (ROFEN, 1959, *op. cit.*, p. 256).

(4) Although direct comparison of specimens is much needed, it may be suggested that (i) the length of the caudal peduncle, (ii) the structure, number and arrangement of the head pores and lateral line pores, (iii) the extent of the cavern-

ous (luminous ?) organ near the vent, dorsal and anal origins, and on the caudal peduncle, may reveal the relationships between the species so far placed in the genera *Cetomimus*, *Gyrinomimus*, *Cetostomus* and *Ditropichthys*.

Additional Notes

Since the foregoing went to press, one of the authors (ABE) has examined the type of *Gyrinomimus grahami* RICHARDSON & GARRICK at the Dominion Museum, Wellington, New Zealand. He wishes to express here his sincere thanks to Dr. John MORELAND of this museum for his kindness and assistance. The existence of the slit behind the 3rd gill-arch of the type specimen seemed to be doubtful on the right side. The jaw teeth were quite different in shape from those of the present new species.